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(54) Title: FAST DISSOLVING ORALLY CONSUMABLE FILMS CONTAINING PHARMACEUTICALLY ACTIVE AGENTS

(57) Abstract: The present invention is related generally to fast dissolving orally consumable films, more particularly to films containing a pharmaceutically active agent.

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FAST DISSOLVING ORALLY CONSUMABLE FILMS CONTAINING PHARMACEUTICALLY ACTIVE AGENTS

Priority Information

This application claims priority to US application number 10/423,735, which is a continuation in part application of US 09/395,104, which claims priority to US provisional application 60/101,798.

Field of the Invention

The present invention is related generally to fast dissolving orally consumable films, more particularly to films containing a pharmaceutically active agent.

Background of Related Technologies

Personal care products can be formulated in a variety of dosage forms, including tablets, capsules, lozenges or strips of edible thin film compositions. Edible thin film compositions applied to the oral cavity can be designed to deliver therapeutic agents to the oral mucosa. One such example is LISTERINE POCKETPAKS™ brand oral care strip products made by Pfizer Inc. of New York are successful examples of an edible film compositions effective in delivering therapeutic agents particularly antimicrobial agents in the form of a combination of essential oils.

Conventional rapidly dissolving orally consumable films absorb water and may become viscous and sticky over time when applied to the moist surface of the mucosa of the oral cavity. Retention of the film may be insufficient to obtain the

desired effect because the film rapidly disintegrates within a relatively short time. Sometimes Is it desirable to have improved covering and adherence to the mucosa surface. Thus, there is a need in the art to develop consumable thin films, having good adhesion and retention to the mucosa of the oral cavity for providing an effective delivery and retention system for antitussive and mucosa coating agents.

Summary

The present invention is generally directed to a consumable film, which is particularly well adapted to rapidly dissolve in the mouth of a consumer. In one particular aspect of the present invention, there is provided a consumable film adapted to adhere to and dissolve in the mouth of a consumer comprising at least one water soluble polymer, at least one antitussive agent and a mucosa-coating effective amount of a mucosa-coating agent. In one embodiment, the mucosa-coating agent is pectin. In another aspect of the invention, there is provided a consumable film adapted to adhere to and dissolve in the oral cavity of a consumer comprising at least one water soluble polymer and a pharmaceutically active agent selected from the group consisting of aspirin, acetaminophen, ibuprofen, ketoprofen, diflunisal, fenoprofen calcium, naproxen, tolmetin sodium, indomethacin, flurbiprofen sodium, celecoxib, valdecoxib, rofecoxib and mixtures thereof.

Another aspect of the present invention is directed to a method of preparing a supple, non-self-adhering film especially suitable for oral delivery of at least one antitussive agent. The method comprises preparing an aqueous phase comprising a mucosa-coating effective amount of a mucosa-coating agent; preparing a film-

forming mixture including at least one water soluble polymer; combining the aqueous phase and the film forming mixture to form a hydrated polymer gel; casting the hydrated polymer gel on a substrate to form a cast gel; and drying the cast gel to form the consumable film, wherein the at least one antitussive agent is added to the aqueous phase, the hydrated polymer gel or both.

Detailed Description

The present invention is directed to a physiological acceptable consumable film that is adapted to dissolve in the mouth of a consumer and adhere to the mucosa of the oral cavity. Consumable films with mucosa coating agents are particularly well-suited for delivering an antitussive agent to the consumer and are useful for treating or alleviating the symptoms and/or irritations associated with sore throats and/or coughing.

In one aspect of the present invention, there is provided a consumable film adapted to adhere to and dissolve in the mouth of a consumer including at least one water soluble polymer, at least one antitussive agent and a mucosa-coating effective amount of a mucosa-coating agent. The mucosa-coating agent is capable of forming a coating that adheres to the mucosa of the mouth and throat whereby the antitussive agent is effectively retained in contact with the affected areas of the mouth and throat for a period time after the consumable film has dissolved.

In another aspect of the invention, there is provided a consumable film adapted to adhere to and dissolve in the oral cavity of a consumer comprising at

least one water soluble polymer and a pharmaceutically active agent selected from the group consisting of aspirin, acetaminophen, ibuprofen, ketoprofen, diflunisal, fenoprofen calcium, naproxen, tolmetin sodium, indomethacin, flurbiprofen sodium, celecoxib, valdecoxib, rofecoxib and mixtures thereof. In one particular embodiment, the consumable film includes the pharmaceutically active agent which is valdecoxib in amounts from about 5 to about 20 milligrams.

The consumable film may include one or more of the following ingredients, including, but not limited to, water, antimicrobial agents, additional film forming agents or water soluble polymers, plasticizing agents, flavorings, sulfur precipitating agents, saliva stimulating agents, cooling agents, surfactants, stabilizing agents, emulsifying agents, thickening agents, binding agents, coloring agents, triglycerides, polyethylene oxides, propylene glycols, sweeteners, fragrances, preservatives and the like, as described in co-pending application U.S. Patent Application No. 09/395,104, by Leung et al., filed September 14, 1999, which is incorporated herein by reference.

In another embodiment of the present invention, the consumable film comprises a single layer including at least one water soluble polymer, at least one antitussive agent and a mucosa-coating effective amount of pectin.

The term "consumable" as used herein is intended to encompass substances including edible compounds, which upon administration to a consumer, is adequately tolerated without causing undue adverse effects or discomfort to the consumer.

Unless specified otherwise, the term "% by weight" as used is based on the total weight of the final product (i.e., the consumable film) as opposed to the formulation used to produce the product, and thus denotes the percent of the total dry weight contributed by the subject ingredient. This theoretical value can differ from the experimental value, because in practice, the consumable film typically retains some of the water and/or other substances such as alcohol (e.g. ethanol) that may be used in preparing the final product.

In one embodiment, the consumable film of the present invention is shaped and sized for administration to the oral cavity. The mucosa-coating agent is capable of imparting throat soothing and throat coating properties to the consumable film as the film dissolves in the consumer's mouth. The dissolved film adheres to the surface of the mouth, typically the roof of the mouth or the tongue, and coats and adheres to the mucosa of the throat, thus providing maximum retention thereon for an extended period of time. As a result, the consumable film of the present invention affords an effective delivery and retention system for therapeutic agents to localized areas within the oral cavity for which treatment with the therapeutic agent is desired. Suitable mucosa-coating agents include pectin, gelatin, and the like, and combinations thereof. In one embodiment, the mucosa-coating agent may be present in amounts ranging from about 0.01% to about 5% by weight, in another embodiment, from about 0.1% to about 2% by weight, and yet another embodiment, from about 0.1% to about 1.0% by weight of the consumable film.

Suitable antitussive agent include alloclamide, amicibone, benproperine, benzonatate, bibenzonium bromide, bromoform, butamirate, butetamate, caramiphen ethanedisulfonate, caramiphen edisylate, carbetapentane, chlophedianol, clobutinol, cloperastine, codeine, codeine methyl bromide, codeine N-oxide, codeine phosphate, codeine sulfate, cyclexanone, dextromethorphan, dibunate sodium, dihydrocodeine, dihydrocodeinone enol acetate, dimemorfan, dimethoxanate, ∀,∀-diphenyl-2-piperidinepropanol, dropropizine, drotebanol, eprazinone, ethyl dibunate, ethylmorphine, fominoben, guaiapate, hydrocodone, isoaminile, levopropoxyphene, morclofone, narceine, normethadone, noscapine, oxeladin, oxolamine, pholcodine, picoperine, pipazethate, piperidione, prenoxdiazine hydrochloride, racemethorphan, taziprinone hydrochloride, tipepidine, zipeprol, and the like and pharmaceutically acceptable salts thereof, and combinations thereof. The antitussive agents as utilized in the present invention may be in the free form or in any non-toxic pharmaceutically acceptable form wherein their therapeutic activity is retained. In one embodiment, the antitussive agent is dextromethorphan hydrobromide.

The antitussive agent, whether a single antitussive agent or combinations thereof, is employed in an effective amount. An "effective amount" is an amount of the antitussive agent that is sufficient to at least reduce the occurrence of coughing and/or the adverse effects of a sore throat, but low enough to avoid any adverse side effects. In addition to the particular antitussive agent or agents chosen, the effective amount of the antitussive agent may vary with the type and/or severity of the coughing condition, the age and physical condition of the patient being treated, the

duration of treatment, the type of concurrent therapy, the specific form (e.g., salt) of the antitussive agent employed, and the particular formulation of the consumable film which contains the antitussive agent. These variations can be readily determined by one of ordinary skill in the art.

The amount of antitussive agent is adjusted to deliver a predetermined dose of the antitussive agent over a predetermined period of time, which may typically vary from 4 to 24 hours, more typically about every 12 hours. A typical adult dose of an antitussive agent will contain from about 1 to about 130 mg, preferably from about 2.5 mg to about 65 mg, more preferably from about 2.5 to about 20 and most preferably about 15 mg of the antitussive agent (e.g., dextromethorphan hydrobromide). A typical child dose of an antitussive agent will contain from about 2.5 to about 10 mg and more preferably about 7.5 mg of dextromethorphan hydrobromide.

Except as otherwise noted, the amount of antitussive agent in the consumable film according to the present invention is designated as % by weight after the "wet" film formulation has been dried and formed into the consumable film. Generally, the amount of the antitussive agent used in the consumable film is from about 0.01% to about 80% by weight based on the total weight of the consumable film, preferably from about 2.5% to about 40% by weight, and more preferably from about 5% to about 30% by weight.

A film can measure from about 1" by about 1.25" (2.54 cm x 3.18 cm) and weigh from about 60 mg to about 190 mg.

Additional therapeutic agents that are effective for treating conditions other than coughing may be added to various embodiments of the present invention, such as an antihistamine, symphathomimetic pharmaceutically active agent (nasal decongestant, bronchodilator), analgesic, anti-inflammatory, cough expectorant and the like, as described in co-pending application U.S. Patent Application No. 09/395,104, by Leung et al., filed September 14, 1999, which is incorporated herein by reference. Other examples of such additional therapeutic agents are well known in the art.

Useful antihistamines include cetirizine, diphenhydramine, loratadine, desloratadine, fexofenadine, montelukast sodium, and the like.

Examples of doses for specific pharmaceutically active agents that can be delivered per one strip of rapidly dissolving oral film are reviewed in Table A.

Table A

Pharmaceutically Active Agent	Dose
Chlorpheniramine Maleate	4-12 mg
Brompheniramine Maleate	4 mg
Dexchlorpheniramine	2 mg
Dexbrompheniramine	2 mg
Triprolidine Hydrochloride	2.5 mg
Cetirizine	5-10 mg
Acrivastine	8 mg
Azatadine Maleate	1 mg
Loratadine	5-10 mg
Phenylephrine Hydrochloride	5-10 mg
Dextromethorphan Hydrobromide	10-30 mg
Sildenafil	25-100 mg
Ketoprofen	12.5-25 mg
Sumatriptan Succinate	35-70 mg
Zolmitriptan	2.5 mg
Loperamide	2 mg
Famotidine	5-10 mg
Nicotine	1-15 mg
Diphenhydramine Hydrochloride	12.5-25 mg
Pseudoephedrine Hydrochloride	15-60 mg
Atorvastatin	5-80 mg
Valdecoxib	5-20 mg
Amlodipine besylate	2.5-10 mg
Rofecoxib	5-25 mg
Setraline hydrochloride	10-100 mg
Ziprasidone	20-80 mg
Eletriptan	10-40 mg
Nitroglycerin	0.3-0.6 mg

The film compositions of the present invention may also be used to supply nutritionally acceptable components such as vitamins, minerals, trace elements, and fibers (preferably soluble fibers).

Examples of vitamins suitable for the incorporation in the composition of the invention include Vitamin A, Vitamin D, Vitamin E, Vitamin K, Vitamin C, folic acid, thiamin, riboflavin, Vitamin B (6), Vitamin B (12), niacin, biotin and panthotenic acid

in pharmaceutical or nutritionally acceptable form. Examples of mineral elements and trace elements suitable for the incorporation in the composition of the invention include calcium, sodium, potassium, phosphorous, magnesium, manganese, copper, zinc, iron, selenium, chromium and molybdenum in pharmaceutical or nutritionally acceptable form.

The term soluble fiber as used herein refers to fibers which are able to substantially undergo fermentation in the colon to produce short chain fatty acids. Examples of suitable soluble fibers include, carubin, pectin, tragacanth, cereal beta-glucan and the like. They may be hydrolysed or not.

Useful water soluble polymers that exhibit film forming properties include pullulan, hydroxypropylmethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, polyvinyl pyrrolidone, carboxymethyl cellulose, polyvinyl alcohol, sodium alginate, polyethylene glycol, tragacanth gum, guar gum, acacia gum, arabic gum, polyacrylic acid, methylmethacrylate copolymers, carboxyvinyl polymers, amylose, high amylose starch, hydroxypropylated high amylose starch, dextrin, chitin, chitosan, levan, elsinan, collagen, zein, gluten, soy protein isolate, whey protein isolate, casein and combinations thereof. In one embodiment of the present invention the film comprises pullulan as a water soluble polymer. The amount of the water soluble polymer will typically be from about 0.01% to about 99% by weight, preferably from about 30% to about 80% by weight, more preferably from about 45% to about 70% by weight of the consumable film and most preferably from about 60% to about 65% by weight of the consumable film.

In another embodiment of the present invention, the consumable film may further include antimicrobial agents including, but not limited to, essential oils as is described in co-pending U.S. Patent Application No. 09/395,104, by Leung et al., filed September 14, 1999, which is incorporated herein by reference. Useful essential oils carvacrol, thymol, eucalyptol, menthol, methyl salicylate, eugenol, gerianol, verbenone, and the like and combinations thereof. One of the preferred combinations of essential oils for use in the present invention is utilized in LISTERINE® brand mouthwash and oral care strips, which is a well known example of antiseptic oral composition that has proven effective in killing microorganisms in the oral cavity contribute to the formation of plaque, gingivitis and bad breath. Essential oils include precisely balanced amounts of thymol, methyl salicylate, menthol and eucalyptol (hereinafter "the preferred essential oils") having antimicrobial activity.

The amounts of the essential oils used in the consumable film of the present invention can vary as long as they are in amounts sufficient to provide antimicrobial efficacy. Generally, the amount of essential oils is up to about 30% and preferably from about 0.05% to about 18% by weight of the consumable film. In one preferred embodiment, the amount of thymol, methyl salicylate and eucalyptol is each from about 0.01% to about 4% by weight, preferably from about 0.05% to about 3.0% by weight and more preferably from about 0.07% to about 2.0% by weight of the consumable film. Menthol may be present in an amount of from about 0.01% to about 15% by weight of the composition, preferably from about 2.0% to about 9.0%

by weight and more preferably from about 3% to about 9% by weight of the consumable film. In certain embodiments, the essential oils are combined in amounts to provide synergistically enhanced antiseptic properties to eradicate plaque-producing germs that cause dental plaque, gingivitis and bad breath.

For embodiments incorporating essential oils, humectants are avoided due to the relatively high content of oil in the consumable, so as to avoid producing an overly moist, self-adhering film. In an embodiment, the consumable film includes a plasticizing agent other than glycerin, which is also a humectant, and with a sweetener other than sorbitol, which is a mild humectant.

Saliva stimulating agents may also be added to the consumable films of the present invention. Useful saliva stimulating agents are disclosed in U.S. Pat. No. 4,820,506, which is incorporated herein by reference in its entirety.

Suitable sweeteners include both natural and artificial sweeteners such as A) water-soluble sweeteners including monosaccharides, disaccharides, polysaccharides and the like, B) water-soluble artificial sweeteners including soluble saccharin salts and the like, C) dipeptide based sweeteners such as L-aspartic acid derived sweeteners including aspartame, neotame and the like, D) derivatives of naturally occurring water-soluble sweeteners including chlorinated derivatives of sucrose, sucralose and the like, E) protein based sweeteners including thaumatoccous danielli (Thaumatin I and II) and the like, and combinations thereof.

In general, an effective amount of auxiliary sweetener is utilized to provide the level of sweetness desired for a particular composition, and this amount will vary with the particular sweetener selected. The effective amount will normally be from about 0.01% to about 10% by weight of the consumable film when using an easily extractable sweetener. The water-soluble sweeteners are usually used in amounts of from about 0.01% to about 10% by weight, and preferably in amounts of from about 2.0% to about 5.0% by weight of the consumable film. The other sweeteners described above, other than water-soluble sweeteners are generally used in amounts of from about 0.01% to about 10% by weight, preferably from about 2% to about 8% by weight, and more preferably from about 3% to about 6% by weight of the consumable film.

A preservative may also be added to the consumable films. The preservative is added in amounts from about 0.001% to about 5%, preferably from about 0.01% to about 1% by weight of the consumable film. Preferred preservatives include sodium benzoate, potassium sorbate and the like, and combinations thereof. Other suitable preservatives include, but are not limited to, salts of edetate, (also known as salts of ethylenediaminetetraacetic acid, or EDTA, such a disodium EDTA).

Another embodiment of the present invention is directed to methods of preparing consumable films of the present invention. Generally, at least one antitussive agent and a mucosa-coating effective amount of a mucosa-coating agent are dissolved in water to form an aqueous phase. The aqueous phase may further include sweeteners, dyes, and the like. A film forming mixture comprising at least

one water soluble polymer (e.g., pullulan) is prepared. The aqueous phase and the film forming mixture are combined and thoroughly mixed to form a hydrated polymer gel. Optionally, an organic phase comprising organic ingredients such as essential oils and other oils (e.g. glycerine, olive oil) flavorants, surfactants (e.g., Polysorbate 80, Atmos 300, Atsurf 596K); and the like, may be combined with the aqueous phase, the film forming mixture or the hydrated polymer gel. The resulting hydrated polymer gel is cast on a suitable substrate to form a cast gel. The cast gel is then dried to form the consumable film.

In another embodiment there is provided a method of preparing the consumable film, it may be desirable to first form the film forming mixture by first hydrating the water soluble polymer with water. The aqueous phase is then prepared by dissolving the other water soluble ingredients such as the antitussive agent, the mucosa-coating agent (e.g., pectin), sweeteners, dyes, and the like in water. Separately, the organic ingredients such as essential oils and other oils (e.g. glycerine, olive oil) flavorants, surfactants (e.g., Polysorbate 80, Atmos 300, Atsurf 596K); and the like are mixed together. The final formulation is then produced by mixing the film forming polymer phase with the aqueous phase, then adding the organic phase. The combined mixture is formed into an emulsion or a hydrated polymer gel.

The resulting hydrated polymer gel is then cast on a suitable substrate and dried to form a film. The consumable film is preferably air-dried and dried under warm air and cut to a desired dimension, packaged and stored. The packaged film

may contain moisture in amounts of from about 0.1% to about 10% by weight, and more preferably from about 4% to about 7% by weight.

The film forming mixture may further include stabilizing agents such as xanthan gum, locust bean gum, carrageenan, and the like, and combinations thereof. These ingredients are mixed and then hydrated in warm water, preferably deionized water until a gel is formed which may take from about 30 to about 48 hours. The water is preferably heated to a temperature of from about 20ºC to about 40ºC to promote hydration. The amount of water is typically from about 40% to about 80% by weight of the gel. The resulting hydrated gel is then chilled to a temperature of from about 20ºC to about 30ºC for about 1 hour to about 48 hours.

The aqueous phase may, in addition to the antitussive agent and the mucosa coating effective amount of the mucosa-coating agent such as pectin, include additives such as coloring agents, copper gluconate and sweetener. Typically the aqueous phase contains from about 5% to about 80% by weight based on the total weight of the final gel mixture.

If sodium saccharin as a selected sweetener and copper gluconate as a selected sulfur precipitating agent are used in the formulation, it is preferable to dissolve them separately in solution to avoid precipitation.

In another embodiment of the present invention, the water soluble polymer is in the form of a powder which is added to the aqueous phase to form a hydrated

polymer gel. The resulting hydrated polymer gel is thoroughly stirred at about room temperature for about 30 minutes to about 48 hours, and then deaerated to remove at least substantially all the air bubbles. The uniform mixture is cast on a suitable substrate, and thereafter dried to form the desired film.

For consumable films containing essential oils, the essential oils are further added to the organic phase and the mixing the organic phase with the hydrated polymer gel. In particular, the essential oils such as menthol and thymol can be mixed optionally in combination with oils to form an oil mixture. Other essentials oils such as methyl salicylate and eucalyptol, and surfactants can then be added to the oil mixture. The oil mixture is then added to the hydrated polymer gel and mixed until a uniform gel is formed. The uniform gel is then cast on a suitable substrate, and thereafter dried to form the consumable film.

In one embodiment for preparing the consumable film, the water soluble polymer may be hydrated without heating the water to reduce energy costs in the manufacturing process. Moreover, since heating may result in undesirable losses of volatile ingredients to evaporation, it would be preferable to avoid heating during the hydration process. For essential oil-containing films, the heat may also affect the germ killing activity of the composition due to the loss of essential oils.

While not wishing to be bound by any theory, it is believed that the film forming ingredients such as the water soluble polymers can be hydrated and mixed without heating due to an ionic effect known as the Donnan equilibrium. Hydrating

the water soluble polymers in the presence of electrolytes in solution effectively lowers the viscosity of the polymer gel being formed, thus increasing the efficiency of the hydrating process. The water-soluble ingredients of the formulation provide the electrolytes, which are dissolved in the hydration solution prior to addition to the water-soluble polymers. High shear mixing also accelerates hydration, which delumps the powders, providing greater surface area for water contact. In addition, local heating effects, generated in the shear regions, provide energy for hydration without substantially raising the temperature of the mass.

EXAMPLE 1

The ingredients listed in Table 1 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water at 75ºC to yield an aqueous phase. Amberlite IRP69 was added to the aqueous phase and stirred for about 4 to 5 hours at about 70ºC to 80ºC. Pectin was added to the aqueous phase very slowly and mixed at high speed. The aqueous phase was allowed to cool to about 50ºC and q.s. with water to replace loss due to evaporation. Potassium sorbate, sweeteners and dye were then added to the aqueous phase and mixed thoroughly.

B) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were mixed together in a separate container to form a film forming mixture.

C) The film forming mixture was slowly added to the aqueous phase of A), followed by overnight mixing at a slow rate to provide a hydrated polymer gel.

D) The flavorants, glycerine, menthol, and surfactants were combined and mixed in a separate container until dissolved to yield an organic phase.

E) Mannitol was mixed together in the remaining 10% water in a separate container. Succulence was then added to the resulting mixture and dissolved.

F) The mixtures of steps D) and E) were added to the hydrated polymer gel and mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The consumable film was dried under warm air and cut to a desired

dimension (dictated by e.g., dosage and mouthfeel). The consumable film was segmented into 1" x 1.25" (2.54 cm x 3.18 cm) dosage units, each of which had a thickness of 0.009 ± 0.002 of an inch (0.23 ± 0.05 of a mm) and a weight of 70 ± 3 mg.

Table 1

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.3940	7.6539	38.2695
Amberlite IRP69	16.0000	23.8870	8.1642	40.8208
Pectin USP	0.3500	0.5225	0.1786	0.8930
Xanthan Gum	0.0766	0.1165	0.0396	0.1980
Locust Bean Gum	0.0901	0.1345	0.0460	0.2299
Carrageenan	0.3861	0.5764	0.1970	0.9851
Pullulan	20.5919	30.7424	10.5072	52.5361
Potassium sorbate	0.0772	0.1153	0.0394	0.1970
Acesulfame Potassium salt	0.6435	0.9607	0.3284	1.6418
Aspartame NF	1.8018	2.6900	0.9194	4.5969
Purified water	-	-	65.8217	329.1085
Menthol	2.5740	3.8428	1.3134	6.5670
Peppermint Flavor	0.2579	0.3850	0.1316	0.6580
Cherry Flavor (Givudan)	0.2579	0.3850	0.1316	0.6580
Cherry Flavor Blend (IFF)	2.2350	3.3367	1.1404	5.7022
Warm Sensation (Mane)	0.5518	0.8238	0.2816	1.4078
Artificial Masking Agent Flavor (Robertet)	0.4139	0.6179	0.2112	1.0560
Succulence (IFF)	0.2579	0.3850	0.1316	0.6580
FD&C Red #40	0.0102	0.0152	0.0052	0.0260
Polysorbate 80 NF	0.4504	0.6724	0.2298	1.1491
Atmos 300	0.4504	0.6724	0.2298	1.1491
Glycerine	1.9305	2.8821	0.9851	4.9253
Mannitol USP	2.5740	3.8428	1.3134	6.5670
Total	66.9821	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 2

The ingredients listed in Table 2 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water at 75ºC to yield an aqueous phase. Amberlite IRP64 was added to the aqueous phase and stirred for about 4 to 5 hours at about 70ºC to 80ºC. Pectin was mixed with glycerine and the mixture was added very slowly to the aqueous phase and then mixed thoroughly at a high rate. The aqueous phase was allowed to cool to about 50ºC and q.s. with water to replace loss due to evaporation. Potassium sorbate and dye were then added to the aqueous phase and mixed thoroughly.

B) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were mixed together in a separate container to form a film forming mixture.

C) The film forming mixture was slowly added to the aqueous phase of A), followed by overnight mixing at a slow rate to provide a hydrated polymer gel.

D) The flavorants and menthol were combined and mixed in a separate container until dissolved to yield an organic phase.

E) Mannitol and sucralose were mixed together in the remaining 10% water in a separate container. Succulence was then added to the resulting mixture and dissolved.

F) The mixtures of steps D) and E) were added to the hydrated polymer gel and mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The consumable film was dried under warm air and cut to a desired

dimension (dictated by e.g., dosage and mouthfeel). The consumable film was segmented into 1" x 1.25" (2.54 cm x 3.18 cm) dosage units, each of which had a thickness of 0.009 ± 0.002 of an inch (0.23 ± 0.05 of a mm) and a weight of 70 ± 3 mg.

Table 2

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.9235	7.8353	39.1765
Amberlite IRP64	16.0000	24.4518	8.3576	41.7882
Pectin USP	0.3500	0.5349	0.1828	0.9141
Xanthan Gum	0.0769	0.1175	0.0402	0.2008
Locust Bean Gum	0.0901	0.1377	0.0471	0.2353
Carrageenan	0.3861	0.5901	0.2017	1.0084
Pullulan	20.5919	31.4693	10.7562	53.7812
Potassium sorbate	0.0772	0.1180	0.0403	0.2016
Purified water	-	-	65.8199	329.0995
Menthol	2.5740	3.9337	1.3445	6.7227
Peppermint Flavor	0.2579	0.3941	0.1347	0.6736
Cherry Flavor (Givudan)	0.2579	0.3941	0.1347	0.6736
Sour Cherry (IFF)	2.2350	3.4156	1.1675	5.8373
Warm Sensation (Mane)	0.5518	0.8433	0.2882	1.4412
Artificial Masking Agent Flavor (Robertet)	0.4139	0.6325	0.2162	1.0810
Succulence (IFF)	0.2579	0.3941	0.1347	0.6736
FD&C Red #40	0.0098	0.0150	0.0051	0.0256
Glycerine	1.9305	2.9503	1.0084	5.0420
Mannitol USP	2.5740	3.9337	1.3445	6.7227
Sucralose	1.8000	2.7508	0.9402	4.7012
Total	65.4349	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 3

The ingredients listed in Table 3 were combined to provide a consumable film of the present invention in accordance with the procedure of Example 1.

Table 3

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.6123	7.7289	38.6445
Amberlite IRP69	16.0000	24.1197	8.2442	41.2208
Pectin USP	0.3500	0.5276	0.1803	0.9017
Xanthan Gum	0.0769	0.1159	0.0396	0.1981
Locust Bean Gum	0.0901	0.1358	0.0464	0.2321
Carrageenan	0.3861	0.5820	0.1989	0.9947
Pullulan	20.5919	31.0420	10.6102	53.0509
Potassium sorbate	0.0772	0.1164	0.0398	0.1989
Purified water	-	-	65.8199	329.0995
Menthol	2.5740	3.8803	1.3263	6.6314
Peppermint Flavor	0.2579	0.388	0.1329	0.6644
Cherry Flavor (Givudan)	0.2579	0.388	0.1329	0.6644
Cherry Flavor Blend (IFF)	2.2350	3.3692	1.1516	5.7580
Warm Sensation (Mane)	0.5518	0.8318	0.2843	1.4216
Artificial Masking Agent Flavor (Robertet)	0.4139	0.6239	0.2133	1.0663
Succulence (IFF)	0.2579	0.3888	0.1329	0.6644
FD&C Red #40	0.0098	0.0148	0.0050	0.0252
Polysorbate 80 NF	0.4504	0.6790	0.2321	1.1604
Atmos 300	0.4504	0.6790	0.2321	1.1604
Glycerine	1.9305	2.9102	0.9947	4.9735
Mannitol USP	2.5740	3.8803	1.3263	6.6314
Sucralose	1.8000	2.7135	0.9275	4.6373
Total	66.3357	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 4

The ingredients listed in Table 4 were combined to provide a consumable film of the present invention in accordance with the procedure of Example 2, except glycerine and surfactants were also added to the flavorants and menthol in step D).

Table 4

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.6123	7.7289	38.6445
Amberlite IRP64	16.0000	24.1197	8.2442	41.2208
Pectin USP	0.3500	0.5276	0.1803	0.9017
Xanthan Gum	0.0769	0.1159	0.0396	0.1981
Locust Bean Gum	0.0901	0.1358	0.0464	0.2321
Carrageenan	0.3861	0.5820	0.1989	0.9947
Pullulan	20.5919	31.0420	10.6102	53.0509
Potassium sorbate	0.0772	0.1164	0.0398	0.1989
Purified water	-	-	65.8199	329.0995
Menthol	2.5740	3.8803	1.3263	6.6314
Peppermint Flavor	0.2579	0.3888	0.1329	0.6644
Cherry Flavor (Givudan)	0.2579	0.3888	0.1329	0.6644
Sour Cherry (IFF)	2.2350	3.3692	1.1516	5.7580
Warm Sensation (Mane)	0.5518	0.8318	0.2843	1.4216
Artificial Masking Agent Flavor (Robertet)	0.4139	0.6239	0.2133	1.0663
Succulence (IFF)	0.2579	0.3888	0.1329	0.6644
FD&C Red #40	0.0098	0.0148	0.0050	0.0252
Polysorbate 80 NF	0.4504	0.6790	0.2321	1.1604
Atmos 300	0.4504	0.6790	0.2321	1.1604
Glycerine	1.9305	2.9102	0.9947	4.9735
Mannitol USP	2.5740	3.8803	1.3263	6.6314
Sucralose	1.8000	2.7135	0.9275	4.6373
Total	66.3357	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 5

The ingredients listed in Table 5 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water at 75ºC to yield an aqueous phase. Amberlite IRP69 was added to the aqueous phase and stirred for about 4 to 5 hours at about 70ºC to 80ºC. Pectin was added to the aqueous phase very slowly and mixed at a high mixing rate. The aqueous phase was allowed to cool to about 50ºC and q.s. with water to replace loss due to evaporation. Potassium sorbate and dye were then added to the aqueous phase and mixed thoroughly.

B) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and PURE-COTE™ B793 (available from Grain Processing Corporation of Muscatine, Iowa) were mixed together in a separate container to form a film forming mixture.

C) The film forming mixture was slowly added to the aqueous phase of A), followed by overnight mixing at a low mixing rate to provide a hydrated polymer gel.

D) The flavorants, glycerine, olive oil, menthol, and surfactants were combined and mixed in a separate container until dissolved to yield an organic phase.

E) Mannitol and sucralose were mixed together in the remaining 10% water in a separate container. Succulence was then added to the resulting mixture and dissolved.

F) The mixtures of steps D) and E) were added to the hydrated polymer gel and mixed uniformly to yield a final polymer gel mixture. The final polymer gel

mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The consumable film was dried under warm air and cut to a desired dimension (dictated by e.g., dosage and mouthfeel). The consumable film was segmented into 1" x 1.25" (2.54 cm x 3.18 cm) dosage units, each of which had a thickness of 0.009 ± 0.002 of an inch (0.23 ± 0.05 of a mm) and a weight of 70 ± 3 mg.

Table 5

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	19.5740	10.6759	106.7593
Amberlite IRP69	16.0001	20.8790	11.3877	113.8771
Pectin USP	0.3499	0.4566	0.2490	2.4905
Xanthan Gum	0.0769	0.1003	0.0547	0.5470
Locust Bean Gum	0.0901	0.1175	0.0641	0.6409
Carrageenan	0.3860	0.5037	0.2747	2.7474
PURE-COTE™ B793	20.5919	26.8711	14.6559	146.5586
Potassium sorbate	0.0772	0.1008	0.0550	0.5498
Purified water	-	-	45.4586	454.5856
Menthol	2.5740	3.3589	1.8320	18.3202
Peppermint Flavor	0.2579	0.3366	0.1836	1.8357
Cherry Flavor (Givudan)	0.2579	0.3366	0.1836	1.8357
Sour Cherry (IFF)	2.2350	2.9165	1.5907	15.9070
Warm Sensation (Mane)	0.5518	0.7200	0.3927	3.9270
Artificial Masking Agent Flavor (Robertet)	0.4140	0.5402	0.2946	2.9463
Succulence (IFF)	0.2579	0.3366	0.1836	1.8357
FD&C Red #40	0.0099	0.0129	0.0070	0.0704
Polysorbate 80 NF	0.4505	0.5878	0.3206	3.2060
Atmos 300	0.4505	0.5878	0.3206	3.2060
Glycerine	8.7335	11.3966	6.2158	62.1585
Olive Oil	3.49934	4.5586	2.4863	24.8634
Mannitol USP	2.5740	3.3589	1.8320	18.3202
Sucralose	1.8001	2.3490	1.2812	12.8116
Total	76.6324	100.0000	100.0000	1000.0000
*Assuming that all water is evaporated				

EXAMPLE 6

The ingredients listed in Table 6 were combined to provide a consumable film of the present invention in accordance with the procedure of Example 5 except pectin was dispersed in 15% glycerine prior to being added to the aqueous phase in Step A).

Table 6

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	18.5409	10.3611	103.6107
Amberlite IRP69	16.0001	19.7771	11.0519	110.5186
Pectin USP	0.3499	0.4325	0.2417	2.4170
Xanthan Gum	0.0769	0.0950	0.0531	0.5309
Locust Bean Gum	0.0901	0.1113	0.0622	0.6220
Carrageenan	0.3860	0.4771	0.2666	2.6664
PURE-COTE™ B793	20.5919	25.4529	14.2236	142.2363
Potassium sorbate	0.0772	0.0955	0.0534	0.5335
Purified water	-	-	44.1179	451.1788
Menthol	2.5740	3.1817	1.7780	17.7799
Peppermint Flavor	0.2579	0.3188	0.1782	1.7816
Cherry Flavor (Givudan)	0.2579	0.3188	0.1782	1.7816
Sour Cherry (IFF)	2.2350	2.7626	1.5438	15.4379
Warm Sensation (Mane)	0.5518	0.6820	0.3811	3.8112
Artificial Masking Agent Flavor (Robertet)	0.4140	0.5117	0.2859	2.8594
Succulence (IFF)	0.2579	0.3188	0.1782	1.7816
FD&C Red #40	0.0099	0.0122	0.0068	0.0684
Polysorbate 80 NF	0.4505	0.5568	0.3111	3.1114
Atmos 300	0.4505	0.5568	0.3111	3.1114
Glycerine	11.6446	14.3935	8.0434	80.4337
Olive Oil	4.8519	5.9973	3.3514	33.5140
Mannitol USP	2.5740	3.1817	1.7780	17.7799
Sucralose	1.8001	2.2250	1.2434	12.4337
Total	80.9021	100.0000	100.0000	1000.0000
*Assuming that all water is evaporated				

EXAMPLE 7

The ingredients listed in Table 7 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water at 75ºC to yield an aqueous phase. Amberlite IRP69 was added to the aqueous phase and stirred for about 4 to 5 hours at about 70ºC to 80ºC. Pectin dispersed in glycerine was added very slowly to the aqueous phase and mixed at a high mixing rate. The aqueous phase was allowed to cool to about 50ºC and q.s. with water to replace loss due to evaporation. The dye was then added to the aqueous phase and mixed thoroughly.

B) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were mixed together in a separate container to form a film forming mixture.

C) The film forming mixture was slowly added to the aqueous phase of A), followed by overnight mixing at a low mixing rate to provide a hydrated polymer gel.

D) The flavorants, menthol, and surfactants were combined and mixed in a separate container until dissolved to yield an organic phase.

E) Mannitol and sucralose were mixed together in the remaining 10% water in a separate container. Succulence was then added to the resulting mixture and dissolved.

F) The mixtures of steps D) and E) were added to the hydrated polymer gel and mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room

temperature. The consumable film was dried under warm air and cut to a desired dimension (dictated by e.g., dosage and mouthfeel).

Table 7

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	G/batch
Dextromethorphan HBr	15.0000	22.5510	7.7080	19.2699
Amberlite IRP64	16.0000	24.0544	8.2218	20.5545
Pectin USP	0.3500	0.5262	0.1799	0.4496
Xanthan Gum	0.0769	0.1156	0.0395	0.0988
Locust Bean Gum	0.0901	0.1355	0.0463	0.1157
Carrageenan	0.3861	0.5805	0.1984	0.4960
Pullulan	20.5919	30.9579	10.5814	26.4536
Potassium sorbate	0.0772	0.1161	0.0397	0.0992
Purified water	-	-	65.8199	164.5498
Menthol	2.5740	3.8698	1.3227	3.3067
Peppermint Flavor	0.2579	0.3877	0.1325	0.3313
Cherry Flavor (Givudan)	0.2579	0.3877	0.1325	0.3313
Sour Cherry (IFF)	2.2350	3.3601	1.1485	2.8712
Warm Sensation (Mane)	0.5518	0.8296	0.2835	0.7089
Artificial Masking Agent Flavor (Robertet)	0.4139	0.6223	0.2127	0.5317
Succulence (IFF)	0.2579	0.3877	0.1325	0.3313
Carmine	0.1900	0.2856	0.0976	0.2441
Polysorbate 80 NF	0.4504	0.6771	0.2314	0.5786
Atsurf 596K	0.4504	0.6771	0.2314	0.5786
Glycerine	1.9305	2.9023	0.9920	2.4800
Mannitol USP	2.5740	3.8698	1.3227	3.3067
Sucralose	1.8000	2.7061	0.9250	2.3124
Total	66.5159	100.0000	100.0000	250.0000
*Assuming that all water is evaporated				

EXAMPLE 8

The ingredients listed in Table 8 were combined to provide a consumable film of the present invention in accordance with the procedure of Example 7.

Table 8

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.5772	7.7169	38.5846
Amberlite IRP64	16.0000	24.0823	8.2314	41.1569
Pectin USP	0.3500	0.5268	0.1801	0.9003
Xanthan Gum	0.0769	0.1157	0.0396	0.1978
Locust Bean Gum	0.0901	0.1356	0.0464	0.2318
Carrageenan	0.3861	0.5811	0.1986	0.9932
Pullulan	20.5919	30.9938	10.5937	52.9686
Carmine	0.1900	0.2860	0.0977	0.4887
Purified water	-	-	65.8199	329.0995
Menthol	2.5740	3.8742	1.3242	6.6211
Peppermint Flavor	0.2579	0.3882	0.1327	0.6634
Cherry Flavor (Givudan)	0.2579	0.3882	0.1327	0.6634
Sour Cherry (IFF)	2.2350	3.3640	1.1498	5.7491
Warm Sensation (Mane)	0.5518	0.8305	0.2839	1.4194
Artificial Masking Agent Flavor (Robertet)	0.4139	0.6230	0.2129	1.0647
Succulence (IFF)	0.2579	0.3882	0.1327	0.6634
Polysorbate 80 NF	0.4504	0.6779	0.2317	1.1586
Atmos 300	0.4504	0.6779	0.2317	1.1586
Glycerine	1.9305	2.9057	0.9932	4.9658
Mannitol USP	2.5740	3.8742	1.3242	6.6211
Sucralose	1.8000	2.7093	0.9260	4.6301
Total	66.4387	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 9

The ingredients listed in Table 9 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water to yield an aqueous phase. Pectin dispersed in glycerine was added very slowly to the aqueous phase and mixed at a high mixing rate. The aqueous phase was allowed to cool to about 50ºC and q.s. with water to replace loss due to evaporation. The dye was then added to the aqueous phase and mixed thoroughly.

B) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were mixed together in a separate container to form a film forming mixture.

C) The film forming mixture was slowly added to the aqueous phase of A), followed by overnight mixing at a low mixing rate to provide a hydrated polymer gel.

D) The flavorants, menthol, and surfactants were combined and mixed in a separate container until dissolved to yield an organic phase.

E) Mannitol and sucralose were mixed together in the remaining 10% water in a separate container. Succulence was then added to the resulting mixture and dissolved.

F) The mixtures of steps D) and E) were added to the hydrated polymer gel and mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The consumable film was dried under warm air and cut to a desired dimension (dictated by e.g., dosage and mouthfeel).

Table 9

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan (Spectrum)	10.9900	18.3460	5.5038	27.5189
Pectin USP	0.5250	0.8764	0.2629	1.3146
Carmine	0.1900	0.3172	0.0952	0.4758
Xanthan Gum	0.1154	0.1926	0.0578	0.2888
Locust Bean Gum	0.1352	0.2256	0.0677	0.3384
Carrageenan	0.5792	0.9668	0.2900	1.4502
Pullulan	30.8879	51.5621	15.4686	77.3431
Purified water	-	-	70	350.0000
Menthol	2.5740	4.2969	1.2891	6.4453
Peppermint Flavor	0.8000	1.3355	0.4006	2.0032
Cherry Flavor (Givudan)	0.8000	1.3355	0.4006	2.0032
Sour Cherry (IFF)	2.2350	3.7310	1.1193	5.5964
Warm Sensation (Mane)	0.8000	1.3355	0.4006	2.0032
Artificial Masking Agent Flavor (Robertet)	0.8000	1.3355	0.4006	2.0032
Succulence (IFF)	0.2579	0.4305	0.1292	0.6458
Polysorbate 80 NF	0.4504	0.7519	0.2256	1.1278
Atmos 300	0.4504	0.7519	0.2256	1.1278
Glycerine	2.0400	3.4054	1.0216	5.1082
Sucralose	2.7000	4.5072	1.3522	6.7608
Mannitol USP	2.5740	4.2969	1.2891	6.4453
Total	59.9042	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 10

The ingredients listed in Table 10 were combined to provide a consumable film of the present invention in accordance with the procedure of Example 7.

Table 10

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan (milled)	10.9900	26.6157	9.2695	18.5390
Amberlite IRP69	2.4000	5.8123	2.0243	4.04486
Pectin USP	0.2698	0.6534	0.2276	0.4551
Carmine	0.1464	0.3546	0.1235	0.2470
Xanthan Gum	0.0594	0.1439	0.0501	0.1002
Locust Bean Gum	0.0694	0.1681	0.0585	0.1171
Carrageenan	0.2975	0.7205	0.2509	0.5019
Pullulan	15.8694	38.4327	13.3850	26.7701
Purified water	-	-	65.1728	130.3456
Menthol	2.5740	6.2337	2.1710	4.3421
Peppermint Flavor	0.1987	0.4812	0.1676	0.3352
Cherry Flavor (Givudan)	0.1987	0.4812	0.1676	0.3352
Sour Cherry (IFF)	1.7225	4.1716	1.4528	2.9057
Warm Sensation (Mane)	0.4252	1.0298	0.3586	0.7173
Artificial Masking Agent Flavor (Robertet)	0.3190	0.7726	0.2691	0.5381
Succulence (IFF)	0.1987	0.4812	0.1676	0.3352
Polysorbate 80 NF	0.3470	0.8404	0.2927	0.5854
Atmos 300	0.3470	0.8404	0.2927	0.5854
Glycerine	1.4877	3.6029	1.2548	2.5096
Mannitol USP	1.9837	4.8041	1.6732	3.3463
Sucralose	1.3873	3.3598	1.1701	2.3402
Total	41.2914	100.0000	100.0000	200.0000
*Assuming that all water is evaporated				

EXAMPLE 11

The ingredients listed in Table 11 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water to yield an aqueous phase at 75ºC. The Amberlite resin was added to the aqueous phase and mixed for about 4 hours at 70ºC to 80ºC. The aqueous phase was allowed to cool to 50ºC and q.s. with water to replace loss due to evaporation.

B) Pectin was dispersed in glycerine and the resulting mixture was added very slowly to the aqueous phase and mixed at a high mixing rate.

C) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were mixed together in a separate container to form a film forming mixture. The film forming mixture was slowly added to the aqueous phase while mixing rapidly. The resulting mixture was mixed overnight at low speed.

D) In a separate container, sodium chloride, mannitol and sucralose was added to the remaining 10% water. Succulence was then added to the mixture to yield a slurry. The slurry was added to the resulting mixture of step C).

E) The flavorants, menthol, and surfactants were combined and mixed in a separate container until dissolved.

F) The mixtures of steps D) and E) were mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The consumable film was dried under warm air and cut to a desired dimension (dictated by e.g., dosage and mouthfeel).

Table 11

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.4137	7.1724	35.8619
Sodium Bicarbonate	4.0000	5.9770	1.9126	9.5632
Amberlite IRP69	8.0000	11.9540	3.8253	19.1264
Pectin USP	0.3500	0.5230	0.1674	0.8368
Yellow #6	0.0200	0.0299	0.0096	0.0478
Xanthan Gum	0.0500	0.0747	0.0239	0.1195
Locust Bean Gum	0.1000	0.1494	0.0478	0.2391
Carrageenan	0.5000	0.7471	0.2391	1.1954
Pullulan	23.3333	34.8657	11.1570	55.7852
Purified water	-	-	68.0000	340.0000
Menthol	2.5700	3.8402	1.2289	6.1443
Tangerine Oil	0.5000	0.7471	0.2391	1.1954
Natural and Artificial Orange	0.3000	0.4483	0.1434	0.7172
Artificial Lemon Oil	0.3000	0.4483	0.1434	0.7172
Warm Sensation (Mane)	0.4000	0.5977	0.1913	0.9563
Artificial Masking Agent Flavor (Robertet)	0.50000	0.7471	0.2391	1.1954
Succulence (IFF)	0.3000	0.4483	0.1434	0.7172
Polysorbate 80 NF	0.6000	0.8965	0.2869	1.4345
Atmos 300	0.6000	0.8965	0.2869	1.4345
Glycerine	2.0000	2.9885	0.9563	4.7816
Sucralose	2.7000	4.0345	1.2910	6.4552
Mannitol USP	3.8000	5.6781	1.8170	9.0850
Sodium Chloride	1.0000	1.4942	0.4782	2.3908
Total	66.9233	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

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EXAMPLE 12

The ingredients listed in Table 12 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water at 75ºC to yield an aqueous phase. Sodium bicarbonate was added and mixed for about 1 hour. Amberlite IRP69 was added to the aqueous phase and stirred for about 2 hours at about 70ºC to 80ºC. The resulting mixture was allowed to cool to 50ºC and q.s. with water for losses due to evaporation. The dye was then added to the aqueous phase and mixed thoroughly.

B) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were added slowly and rapidly mixed together in a separate container to form a film forming mixture. The mixture was mixed overnight at a low speed. Pectin dispersed in glycerine was added very slowly to the a film forming mixture and mixed at a high mixing rate.

C) The film forming mixture was slowly added to the aqueous phase of A), followed by overnight mixing at a low mixing rate to provide a hydrated polymer gel.

D) In another container the remaining 10% water was added to dissolve mannitol and sucralose. Succulence was then added and mixed to dissolve. The resulting mixture was added to the hydrated polymer gel.

E) The flavorants, menthol, and surfactants were combined and mixed in a separate container until dissolved to yield an organic phase.

F) The mixtures of steps D) and E) were added together and mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The

consumable film was dried under warm air and cut to a desired dimension (dictated by e.g., dosage and mouthfeel).

Table 12

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	27.3219	9.6903	484.5135
Amberlite IRP69	8.0000	14.5717	5.1681	258.4072
Pectin USP	0.2698	0.4914	0.1743	8.7148
Sodium bicarbonate anhydrous	4.0000	7.2858	2.5841	129.2036
Carmine	0.1464	0.2667	0.0946	4.7289
Xanthan Gum	0.0594	0.1082	0.0384	1.91187
Locust Bean Gum	0.0694	0.1264	0.0448	2.2417
Carrageenan	0.2975	0.5419	0.1922	9.6095
Pullulan	15.8690	28.9047	10.2517	512.5830
Purified water	-	-	64.5329	3226.6450
Menthol	2.5740	4.6884	1.6629	83.1425
Peppermint Flavor	0.1987	0.3619	0.1284	6.4182
Cherry Flavor (Givudan)	0.1987	0.3619	0.1284	6.4182
Cherry Flavor Blend (IFF)	1.7225	3.1375	1.1128	55.6383
Warm Sensation (Mane)	0.4252	0.7745	0.2747	13.7343
Artificial Masking Agent Flavor (Robertet)	0.3190	0.5810	0.2061	10.3040
Succulence (IFF)	0.1987	0.3619	0.1284	6.4182
Polysorbate 80 NF	0.3470	0.6320	0.2242	11.2084
Atmos 300	0.3470	0.6320	0.2242	11.2084
Glycerine	1.4877	2.7100	0.9611	48.0573
Mannitol USP	1.9837	3.6132	1.2815	64.0753
Sucralose	1.3873	2.5269	0.8962	44.8110
Total	54.9011	100.0000	100.0000	50000.0000
*Assuming that all water is evaporated				

EXAMPLE 13

The ingredients listed in Table 13 were combined to provide a consumable film of the present invention in accordance with the procedure of Example 11, except methyl salicylate, eucalyptol, and thymol were also added to the flavorants, menthol, and surfactants in Step E).

Table 13

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.1962	7.1028	35.5139
Sodium Bicarbonate	4.0000	5.9190	1.8941	9.4704
Amberlite IRP69	8.0000	11.8380	3.7882	18.9408
Pectin USP	0.3500	0.5179	0.1657	0.8287
Yellow #6	0.0200	0.0296	0.0095	0.0474
Xanthan Gum	0.0500	0.0740	0.0237	0.1184
Locust Bean Gum	0.1000	0.1480	0.0474	0.2368
Carrageenan	0.5000	0.7399	0.2368	1.1838
Pullulan	23.3333	34.5274	11.0488	55.2438
Purified water	-	-	68.0000	340.0000
Thymol	0.1698	0.2513	0.0804	0.4020
Methyl Salicylate	0.2430	0.3596	0.1151	0.5753
Eucalyptol	0.2430	0.3596	0.1151	0.5753
Menthol	2.5700	3.8030	1.2169	6.0847
Tangerine Oil	0.5000	0.7399	0.2368	1.1838
Natural and Artificial Orange	0.3000	0.4439	0.1421	0.7103
Artificial Lemon Oil	0.3000	0.4439	0.1421	0.7103
Warm Sensation (Mane)	0.4000	0.5919	0.1894	0.9470
Artificial Masking Agent Flavor (Robertet)	0.50000	0.7399	0.2368	1.1838
Succulence (IFF)	0.3000	0.4439	0.1421	0.7103
Polysorbate 80 NF	0.6000	0.8878	0.2841	1.4206
Atmos 300	0.6000	0.8878	0.2841	1.4206
Glycerine	2.0000	2.9595	0.9470	4.7352
Sucralose	2.7000	3.9953	1.2785	6.3925
Mannitol USP	3.8000	5.6230	1.7994	8.9969
Sodium Chloride	1.0000	1.4797	0.4735	2.3676
Total	67.5791	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

EXAMPLE 14

The ingredients listed in Table 14 were combined to provide a consumable film of the present invention in accordance with the following procedure:

A) Dextromethorphan HBr was mixed and dissolved in 90% water to yield an aqueous phase at 75ºC. Sodium hydroxide was added to the aqueous phase and thoroughly mixed. The Amberlite resin was then added to the aqueous phase and mixed for about 4 hours at 70ºC to 80ºC. The aqueous phase was allowed to cool to 50ºC and q.s. with water to replace loss due to evaporation.

B) Pectin was added very slowly to the aqueous phase while mixing at a high mixing rate.

C) The film-forming ingredients, xanthan gum, locust bean gum, carrageenan and pullulan were mixed together in a separate container to form a film forming mixture. The film forming mixture was slowly added to the aqueous phase while mixing rapidly. The resulting mixture was mixed overnight at low speed.

D) In a separate container, mannitol and sucralose were added to the remaining 10% water. Succulence was then added to the mixture to yield a slurry. The slurry was added to the resulting mixture of step C).

E) The flavorants, menthol, and surfactants were combined and mixed in a separate container until dissolved.

F) The mixtures of steps D) and E) were mixed uniformly to yield a final polymer gel mixture. The final polymer gel mixture was poured on a mold and cast to form a film of a desired thickness at room temperature. The consumable film was dried under warm air and cut to a desired dimension (dictated by e.g., dosage and mouthfeel).

Table 14

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	23.1042	7.3933	36.9667
Sodium hydroxide 1N solution	5.0000	7.7014	2.4644	12.3222
Amberlite IRP69	8.0000	12.3222	3.9431	19.7156
Pectin USP	0.3500	0.5391	0.1725	0.8626
Yellow #6	0.0200	0.0308	0.0099	0.0493
Xanthan Gum	0.0500	0.0770	0.0246	0.1232
Locust Bean Gum	0.1000	0.1540	0.0493	0.2464
Carrageenan	0.5000	0.7701	0.2464	1.2322
Pullulan	23.3333	35.9398	11.5007	57.5037
Purified water	-	-	68.0000	340.0000
Menthol	2.5700	3.9585	1.2667	6.3336
Tangerine Oil	0.5000	0.7701	0.2464	1.2322
Natural and Artificial Orange	0.3000	0.4621	0.1479	0.7393
Artificial Lemon Oil	0.3000	0.4621	0.1479	0.7393
Warm Sensation (Mane)	0.4000	0.6161	0.1972	0.9858
Artificial Masking Agent Flavor (Robertet)	0.5000	0.7701	0.2464	1.2322
Succulence (IFF)	0.3000	0.4621	0.1479	0.7393
Polysorbate 80 NF	0.6000	0.9242	0.2957	1.4787
Atmos 300	0.6000	0.9242	0.2957	1.4787
Sucralose	2.7000	4.1588	1.3308	6.6540
Mannitol USP	3.8000	5.8531	1.8730	9.3649
Total	64.9233	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

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EXAMPLE 15

The ingredients listed in Table 15 were combined to provide a consumable film of the present invention in accordance with the procedure Example 14, except methyl salicylate, eucalyptol, and thymol were also added to the flavorants, menthol, and surfactants in Step E).

Table 15

Material	mg/dose*	%w/w* Dry Film	%w/w Actual Batch	g/batch
Dextromethorphan HBr	15.0000	22.7690	7.2861	36.4304
Sodium hydroxide 1N solution	4.0000	7.5897	2.4287	12.1435
Amberlite IRP69	8.0000	12.1435	3.8859	19.4295
Pectin USP	0.3500	0.5313	0.1700	0.8500
Yellow #6	0.0200	0.0304	0.0097	0.0486
Xanthan Gum	0.0500	0.0759	0.0243	0.1214
Locust Bean Gum	0.1000	0.1518	0.0486	0.2429
Carrageenan	0.5000	0.7590	0.2429	1.2143
Pullulan	23.3333	35.4184	11.3339	56.6694
Purified water	-	-	68.0000	340.0000
Thymol	0.1698	0.2577	0.0825	0.4124
Methyl Salicylate	0.2430	0.3689	0.1180	0.5902
Eucalyptol	0.2430	0.3689	0.1180	0.5902
Menthol	2.8700	4.3565	1.3941	6.9703
Tangerine Oil	0.5000	0.7590	0.2429	1.2143
Natural and Artificial Orange	0.3000	0.4554	0.1457	0.7286
Artificial Lemon Oil	0.3000	0.4554	0.1457	0.7286
Warm Sensation (Mane)	0.4000	0.6072	0.1943	0.9715
Artificial Masking Agent Flavor (Robertet)	0.50000	0.7590	0.2429	1.2143
Succulence (IFF)	0.3000	0.4554	0.1457	0.7286
Polysorbate 80 NF	0.6000	0.9108	0.2914	1.4572
Atmos 300	0.6000	0.9108	0.2914	1.4572
Sucralose	2.7000	4.0984	1.3115	6.5575
Mannitol USP	3.8000	5.7681	1.8458	9.2290
Total	67.5791	100.0000	100.0000	500.0000
*Assuming that all water is evaporated				

The forgoing discussion discloses and describes merely exemplary embodiments of the present invention. One skilled in the art will readily recognize from such discussion, and from the accompanying claims, that various changes,

modifications, and variations can be made therein without departing from the spirit and scope of the invention as defined in the following claims.

We Claim:

1. A consumable film adapted to adhere to and dissolve in the oral cavity of a consumer comprising at least one water soluble polymer, at least one antitussive agent and a mucosa-coating effective amount of a mucosa-coating agent.

2. The consumable film of claim 1 wherein the mucosa-coating effective amount of the mucosa-coating agent is from about 0.01% to about 5% by weight based on the total weight of the consumable film.

3. The consumable film of claim 1 wherein the mucosa-coating agent is selected from the group consisting of pectin, gelatin and combinations thereof.

4. The consumable film of claim 1 wherein the mucosa-coating agent is pectin.

5. The consumable film of claim 1 wherein the antitussive agent is selected from the group consisting of alloclamide, amicibone, benproperine, benzonatate, bibenzonium bromide, bromoform, butamirate, butetamate, caramiphen ethanedisulfonate, caramiphen edisylate, carbetapentane, chlophedianol, clobutinol, cloperastine, codeine, codeine methyl bromide, codeine N-oxide, codeine phosphate, codeine sulfate, cyclexanone, dextromethorphan, dibunate sodium, dihydrocodeine, dihydrocodeinone enol acetate, dimemorfan,

dimethoxanate, dropropizine, drotebanol, eprazinone, ethyl dibunate, ethylmorphine, fominoben, guaiapate, hydrocodone, isoaminile, levopropoxyphene, morclofone, narceine, normethadone, noscapine, oxeladin, oxolamine, pholcodine, picoperine, pipazethate, piperidione, prenoxdiazine hydrochloride, racemethorphan, tazIprinone hydrochloride, tipepidine, zipeprol and pharmaceutically acceptable salts thereof, and combinations thereof.

6. The consumable film of claim 1 wherein the at least one antitussive agent is dextromethorphan hydrobromide.

7. The consumable film of claim 1 wherein the antitussive agent is present in amounts of from about 2.5 mg to about 20mg.

8. A consumable film adapted to adhere to and dissolve in the oral cavity of a consumer comprising at least one water soluble polymer and a pharmaceutically active agent, wherein said pharmaceutically active agent is selected from the group consisting of aspirin, acetaminophen, ibuprofen, ketoprofen, diflunisal, fenoprofen calcium, naproxen, tolmetin sodium, indomethacin, flurbiprofen sodium, celecoxib, valdecoxib, rofecoxib and mixtures thereof.

9. The consumable film of claim 8, wherein said pharmaceutically active agent is valdecoxib.

10. The consumable film of claim 9, wherein said valdecoxib is present in amounts from about 5 to about 20 milligrams.

11. The consumable film of claim 1 or 8 wherein the at least one water soluble polymer is selected from the group consisting of pullulan, hydroxypropylmethyl cellulose; hydroxyethyl cellulose, hydroxypropyl cellulose, polyvinyl pyrrolidone, carboxymethyl cellulose, polyvinyl alcohol, sodium alginate, polyethylene glycol, tragacanth gum, guar gum, acacia gum, arabic gum, polyacrylic acid, methylmethacrylate copolymer, carboxyvinyl polymer, amylose, high amylose starch, hydroxypropylated high amylose starch, dextrin, chitin, chitosan, levan, elsinan, collagen, zein, gluten, soy protein isolate, whey protein isolate, casein and combinations thereof.

12. The consumable film of claim 11 wherein said at least one water soluble polymer is pullulan.

13. The consumable film of claim 1 or 8 wherein the film is in the form of a single layer.

INTERNATIONAL SEARCH REPORT

International Application No
/IB2004/001253

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K9/00 A61K31/485

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, MEDLINE, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/70194 A (WARNER LAMBERT CO) 27 September 2001 (2001-09-27) page 4, line 10 - line 15 page 5, line 13 - line 15 table 1 claims 1-4,6,7	1-13
X	WO 03/030881 A (KOSMOS PHARMA ; YANG ROBERT K (US); FUISZ RICHARD C (US)) 17 April 2003 (2003-04-17) page 1, line 6 - line 10 table 1 claims 1-3,5,6,15,27	1-13
X	US 2003/008008 A1 (LEUNG SAU-HUNG SPENCE ET AL) 9 January 2003 (2003-01-09) table 3 claims 1,7,11,35	1-13

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
21 September 2004	05/10/2004

Name and mailing address of the ISA	Authorized officer
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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